SURGICAL SERVICES OPTIMIZATION: FIRST CASE STARTS AND TURNOVER TIME

by

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ABSTRACT

Operating room (OR) efficiencies are vital to the financial success of the hospital. Due to the negative outlook for hospital reimbursements and the rising costs of delivering care, it is important for hospitals to optimize OR efficiency for decreased costs and increased revenues. On-time first case starts (FCS) and turnover time (TOT) are two metrics that set the stage for other OR efficiencies to follow. The case of a community hospital is applied to four successful OR efficiency programs for opportunities for improvement. Opportunities to decrease OR costs and optimize surgical services metrics will thereby increase the OR capacity and revenue generating ability. OR efficiency is significant to the field of public health because optimization of efficiency contributes to the hospital's financial success and long-term viability in serving the community's needs.

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PREFACE

The topic of this essay was developed through my experience as an administrative resident at a community hospital, where I was involved in many projects surrounding surgical services operations.

I would like to acknowledge my primary essay advisor, Dr. Nicholas Castle, for his guidance throughout the development of my essay, my second reader, Dr. Bopaya Bidanda, for his insight and industrial engineering expertise and my third reader and residency preceptor, Ms. Amy Bush, for her guidance throughout my residency and surgical services expertise.

1.0 INTRODUCTION

Efficiencies in surgical services are imperative to the hospital's financial viability. Likewise, if the operating room (OR) performs in a less than optimal manner when compared to benchmarks, the hospital essentially has a lost revenue opportunity. Due to the future of decreased reimbursements and rising costs, there is urgency for operating rooms to improve efficiency metrics. Starting with on-time first case starts and turnover time, the OR has the opportunity to optimize resources and thereby significantly enhance surgical services metrics.

Accelerated by the size of the federal and state budget deficits and unsustainable growth in health care costs, hospitals are placing an increased amount of emphasis on cost containment. While the operating room (OR) is often the largest revenue generating department of a hospital, it is also the most costly (Cima, Brown, Hebl, Moore, Rogers, Kollengode, Amstutz, Weisbrod, Narr, & Deschamps, 2011). Though cost controlling measures are faced throughout the hospital, the OR presents a unique opportunity to embark upon greater efficiency while tackling the main contributing unit to the hospital's financial success.

Some estimates report operating room costs to be $10-$30 per minute (Glover, Van Aken, Creehan, & Skevington, 2009), and roughly 20-40% of the hospital’s cost can be attributed to the OR (Garner, 2012). In contrast to the costliness, the OR has considerable revenue earning capabilities, which some estimate at greater than 60% of the total revenue of the hospital (Garner, 2012). Due to the large associated cost, ORs can often be a department where hospitals look to cut costs the most. As a result, existing inefficiencies may be exacerbated, thus creating a priority for surgical services optimization through enhanced efficiency. Similarly, by improving the operational efficiencies, hospitals have the opportunity to decrease waste, thereby decreasing costs and increasing revenue capabilities.

In this case, a community hospital's OR efficiency efforts will be explored through applying strategies that proved effective in other organizations throughout the country. Aside

from recommending strategies to optimize surgical services metrics, the over-arching goal of this optimization is to decrease costs and increase revenue capability.

1.1 SIGNIFICANCE OF OPERATING ROOM EFFICIENCY

Health reform will continue to have a considerable impact on hospital reimbursement. With decreased reimbursement from third-party payors and most notably Medicare and Medicaid, academic medical centers are faced with the challenge to "do more with less." The reimbursement cuts are projected to grow over the next decade, which forces hospitals to reach optimal efficiency in all operational areas. As the OR produces the largest revenue, improving OR efficiency becomes of crucial importance to the financial viability of the hospital (Cima et al., 2011).

According to the American Hospital Association, The Centers for Medicare and Medicaid Services (CMS) payment rates fall below the actual cost of providing care, thus resulting in underpayments (American Hospital Association, 2015). In a recent update, the American Hospital Association found that Medicare reimburses hospitals 88 cents per dollar spent on care, while Medicaid reimburses 90 cents per dollar spent on care. This results in combined CMS underpayments of $51 billion in 2013, and this number is projected grow over the next decade.

Separate from the inevitable reimbursement cuts, many if not all healthcare organizations are facing budget reductions within their organization. Proposed budget cuts may include significant reductions in salary expenses by the start of the next fiscal year. These substantial cuts force management to find innovative ways to control their expenses, such as consolidating positions or flexing staff down while managing to their key process indicators. With heightened focus on cost containment and coping with dramatically reduced reimbursements, hospitals have the opportunity to maximize cost savings through increased OR efficiency.

1.2 CASE OF PITTSBURGH AREA COMMUNITY HOSPITAL

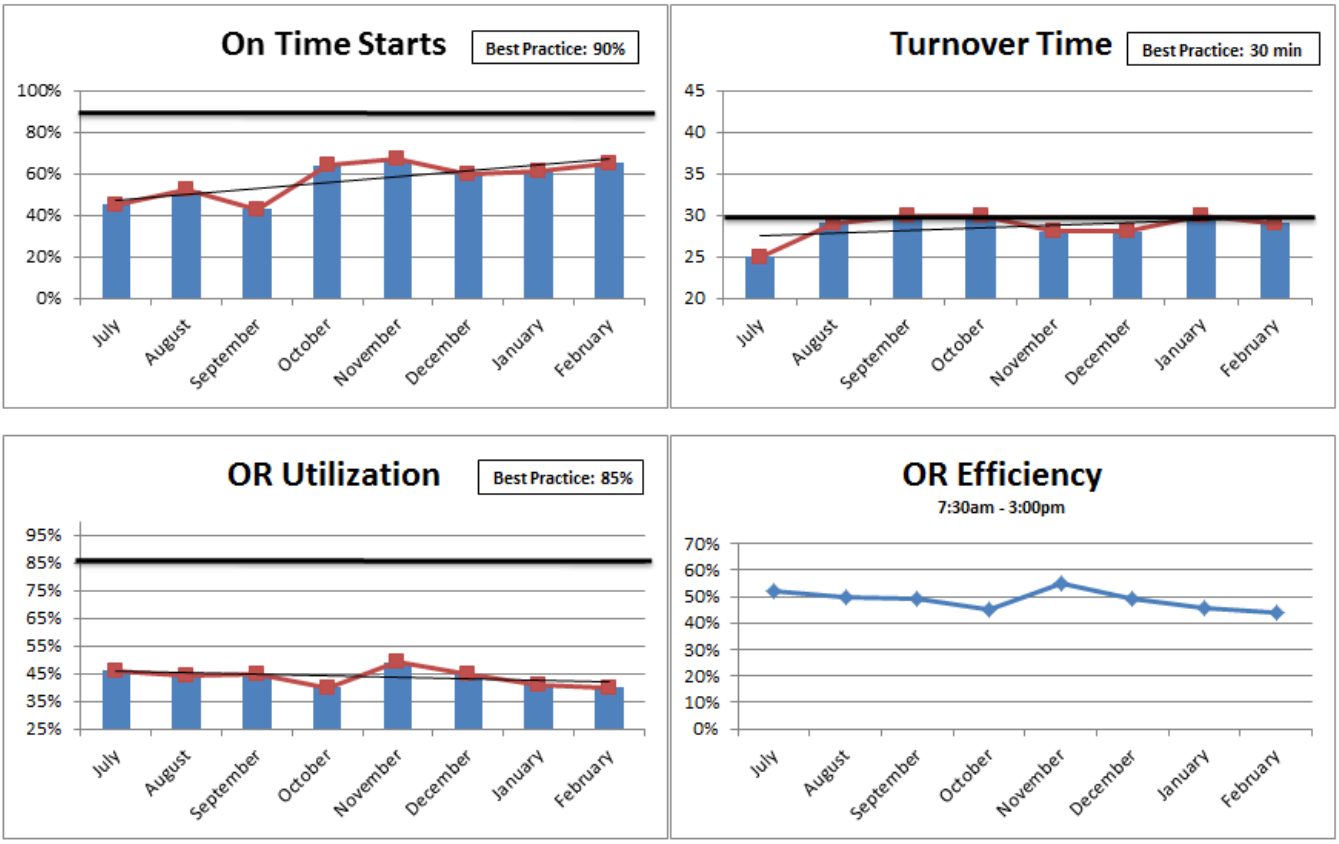
The hospital described in this case study is a community hospital located southeast of Pittsburgh and is also part of a large integrated health system. Like most academic medical centers, the organization as a whole is seeking innovative ways to significantly reduce costs while maintaining a stable or profitable outlook in the ever-changing healthcare environment.

The OR performs over 3,500 surgical cases per year across six ORs with a staff of 15 full-time equivalents (FTEs), including nurses and surgical technicians. In order to maximize the OR's revenue generating ability, management identified the need to increase OR utilization, which begins with greater efficiency in first case starts and turnover time. For purposes of this case study, the focus will be on first case starts and turnover time, both of which greatly contribute and set the stage for optimization of the remaining OR efficiency metrics.

On-time first case starts (FCS) are defined as cases with "anesthesia release" time by 7:30am. These are the first case of the day, where the time when patient positioning and surgical preparation can proceed without interference from anesthesia related activity.

Turnover time (TOT) can have several definitions. In this case, TOT refers to room turnover, which is "wheels out" to "wheels in" time for same surgeon cases. TOT can also be described as the time between patient X leaving the room and patient Y entering the room. The TOT metric encompasses several activities including transporting the patient X to recovery, housekeeping services cleaning the room, prepping the room with supplies and instruments for the next case and patient Y arriving and being prepped for their procedure on time.

Figure 1 illustrates fiscal year 2015 trends of OR efficiency, OR utilization, FCS and TOT. OR efficiency incorporates how well time and resources are utilized; OR utilization measures the OR's capacity and has a best practice target of 90%; FCS measures the percentage of first with an anesthesia release time by 7:30am with a best practice target of 85%; and TOT measures room turnover with a best practice target of 30 minutes or less.



Source: OR Dashboard of Key Statistics, February 2015

Figure 1: Fiscal Year To Date 2015 Surgical Services Metrics

The majority of delays in FCS are attributed to the surgeon, including late surgeon arrival and surgeon missing patient consents and standard history and physical. Thus far, the OR implemented standard operating procedures in an effort to increase FCS and reduce TOT for optimized efficiency. A letter was sent to all surgeons on staff initiating an effort to improve FCS (**Figure 2**). The letter outlined what time the surgeon should arrive and mark the patient for the case as well as the goals of this initiative and surgeon expectations. As an incentive to reach an internal target of FCS at 80% or greater, surgeons were notified that additional block time would be allotted based on productivity. On the contrary, surgeons with poor performance (FCS of < 65%) for two consecutive quarters would lose block time. To enforce the FCS initiative, an additional letter was drafted to send to surgeons as a notification of three or more late starts (**Figure 3**). This letter stood as a precautionary measure to enforce the rule and formally notify surgeons when they would lose block time due to poor FCS efficiency.

Dear Surgeons:

On behalf of the Surgical Services Oversight Committee, I am writing to share the decisions agreed upon at the [Date] meeting. The decisions outlined below are part of our continued effort to elevate operating room efficiency:

- We would like to clarify the attending surgeon arrival time for site marking. The attending surgeon is defined as the individual ultimately accountable for the procedure and will be present when the procedure is being performed. The surgical consent must reflect the attending surgeon.
- Surgeon arrival for first case start is 7:00am for 7:10am case, i.e., the patient should be marked by 7:00am.
- Weekly log with delay reasons will be posted. Names of individuals related to delay will be displayed; this includes nursing, anesthesia, surgeons, and ancillary services.
- Three or more late starts in one month for first case of day will result in loss of first case start privileges for one month. Cases will be scheduled in available "to follow slots."
- Target for on time starts is 80% or greater.

In addition, additional block time will be allotted based upon productivity (>100% utilization) and on time starts at or > than 80%. Block time will be reallocated if less than 65% for two consectutive quarters.

Thank you in advance for your cooperation and support in achieving operating room efficiency.

Source: Director of OR

Figure 2: Letter to Surgeons: On-Time Starts Initiative

Dear Surgeons:

On behalf of the Surgical Services Oversight Committee, I am writing to inform you of your 3 or more 1st case late starts in the month of _____.

Please note effective _____, you will lose your ability to schedule 1st case starts for 1 month. You are permitted to schedule in "to follow slots." This decision was made on behalf of SSOC at the [Date] meeting.

Thank you in advance for your cooperation.

Source: Director of OR

Figure 3: Letter to Surgeons - Notification of Three or More Late Starts

An additional measure taken to improve FCS was the practice of prepping pre-operative (pre-op) patients on the sixth floor of the hospital before they are taken to the OR on the seventh floor. The sixth floor is the location of the ambulatory surgical unit (ASU) and is the location where many patients' families wait for the patient during surgery. One goal of prepping patients on the sixth floor was an effort to ensure surgeons arrived on time. Because there would be an extra time requirement for patients to be transported from the sixth to seventh floor, surgeons would have to make arriving early a priority. In this model, the surgeon would greet the patient and family as well as mark the patient for surgery on the sixth floor. Then, the patient would be transported to the seventh floor and wheeled in for surgery. A process flow map is detailed in **Figure 4**.

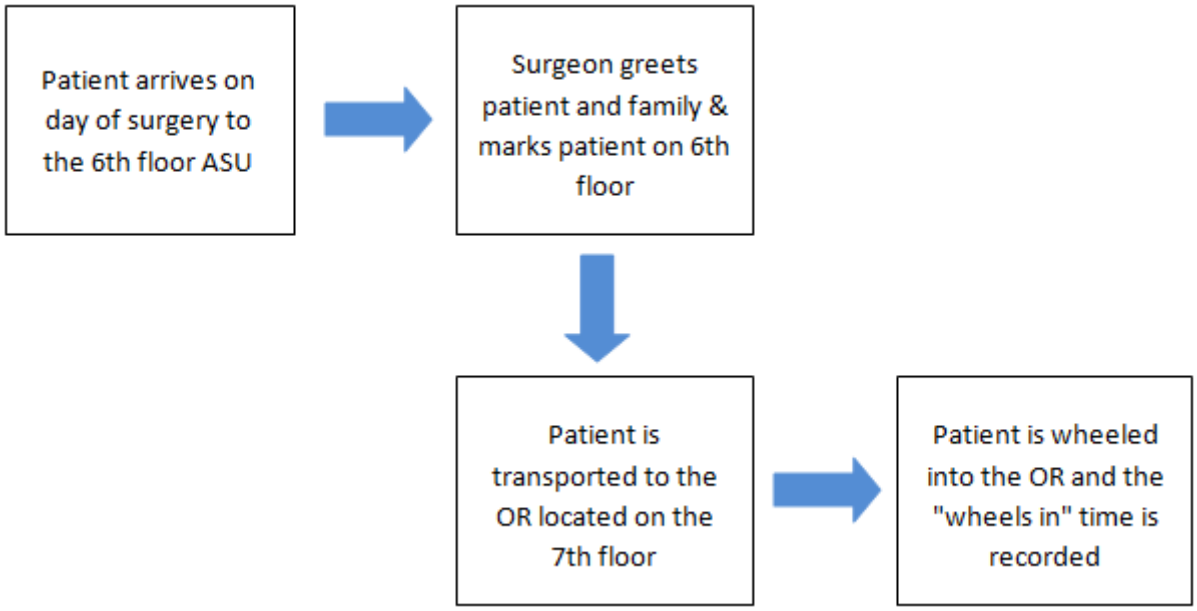


Figure 4: New Process Implemented for Prepping Patients and Transporting to Surgery

By involving the ASU team and the OR team to work together efficiently, an emphasis on teamwork was required. Many members of the ASU and OR staff worked at the hospital for decades and had never met each other before this practice was implemented. While management identified the importance of early surgeon arrival and teamwork among staff, an overarching goal was that of patient- and family- centered care. By greeting the patient and

family on the sixth floor, the surgeon was able to address any of their questions and concerns as well as reassure the safety of the patient. This practice received substantial push-back, mainly from the surgeons and particularly physician leadership. Resistance to change recently caused the Chair of Surgery to appeal this practice and revert to the previous process of prepping and greeting patients on the seventh floor (**Figure 5**). In this model, families are not always greeted by the surgeon, which moves away from the patient- and family- centered environment. In addition, by prepping patients on the seventh floor, surgeons are not as pressured to make early arrival a priority.

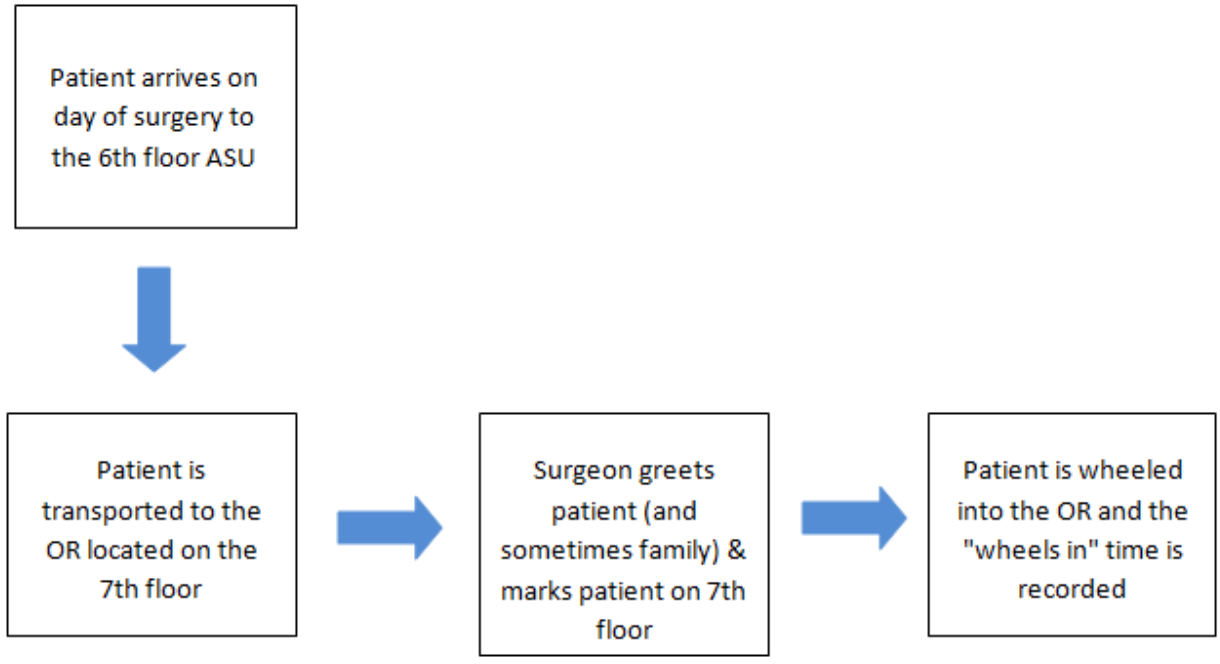


Figure 5: Old Process for Prepping Patients and Transporting to Surgery

While the OR is currently at or above the best practice target for TOT, there is opportunity to further reduce TOT closer to 25 minutes. Based on the OR's case-mix or complexity of cases, management identified it is feasible to operate similar to an ambulatory surgery center. Ambulatory surgical centers have less acute cases and therefore shorter TOT. To begin the process of further reducing TOT, a project was initiated with internal process improvement specialists. Currently, this project is on hold upon completion of current construction and workflow changes between the OR and Sterile Processing Department (SPD).

Though the metrics are trending in the right direction, the hospital ranks at the bottom compared to other hospitals within the system. Additionally, difficult and innovative budget cuts will soon be implemented in all areas of the hospital for the new fiscal year. Now more than ever, there is a need to optimize efficiency metrics through continued improvements and engaging staff to sustain efficiency moving forward.

1.3 IMPROVEMENT STRATEGIES

Due to the unpredictable environment in this new era of healthcare reform, it is imperative that hospitals adapt and transform to be as operationally efficient as possible. In improving efficiency, there is often the requirement of changing processes, roles and responsibilities, which many physicians and employees may be hesitant to endorse. Resistance to change is inevitable, yet necessary to overcome in order to effectively optimize efficiency. A literature review was conducted on four organizations that have broken barriers to implement change and significantly improve OR efficiency and capacity, including FCS and TOT metrics. First, UC Davis Medical Center implemented a bottom-up approach by heavily involving front line staff (Sohrakoff et al., 2014). Stony Brook Medical Center launched a comprehensive OR efficiency program with work groups focusing on separate components (Scheriff et al., 2008). The Healthcare Financial Management Association (HFMA) presented a case study of a for-profit hospital in which a rapid cycle approach was implemented to achieve results in a short amount of time (Philander & Kupietzky, 2011). Lastly, a financial incentive program was initiated at the University of Maryland School of Medicine's Trauma Center, which proved to significantly improve metrics and reduce OR costs (Scalea et al., 2014).

1.3.1 Bottom-up Approach: UC Davis Medical Center

UC Davis Medical Center, a 578-bed academic medical center in southern California, launched an initiative to increase OR efficiency through use of a bottom-up approach (Sohrakoff et al., 2014). In this case, front line staff members were the drivers of the improvement process,

which consisted of four stages. The first step was to identify key improvement opportunities, where management appointed a task force to name the areas that should be of focus. These key areas included TOT, scheduling, preoperative and support services. After determining these areas, root causes in each were identified to drill down on the issues. Step two was to develop goals and build teams. Multidisciplinary Management Action Teams (MATs) comprised of surgeons, anesthesiologists, nurses, clinic and support staff act as a work group to incorporate all perspectives to each focus area. The MATs create measurable goals to track and evaluate progress. Additionally, the MATs report to the Continuous Quality Improvement Steering Committee (CQISC), which is chaired by the COO and includes other executive leaders. Next, step three is implementation of solutions determined by MATs and CQISC. The final step four is to evaluate the process through feedback.

Implementation of these initiatives showed significant improvements in OR efficiency (Sohrakoff et al., 2014). Through improvements in the four main MAT areas, UC Davis Medical Center saw a 70% reduction in the length of delay in FCS while the number of on-time FCS increased by 364%. Perhaps the most substantial gains made in this initiative were the potential millions of dollars in additional revenue by freeing 5,500 hours in the OR. In addition to increasing OR efficiency metrics, the authors note the initiative of MATs change the culture of this department, which enhanced the teamwork amongst staff for optimization.

1.3.2 Comprehensive OR Efficiency Program: Stony Brook Medical Center

Following an OR staff retreat to combat declining patient and physician satisfaction, Stony Brook Medical Center's perioperative leadership team implemented an OR efficiency program (Scheriff et al., 2008). This retreat included breakout sessions in which work groups identified the following key areas for improvement: on-time starts, patient transfers to the OR, TOT, surgeon preference cards, consistent staff performance and communication across disciplines. One aspect of this program was the Supply Chain and Operating Room Enhancement (SCORE) project, which consisted of consultants and three hospital employees. In this case, the employees submitted an application to be a part of the year-long project and were accepted by the consulting team. The roles and responsibilities of this group were to act as

project managers who analyzed data, initiate improvement strategies and routinely report on the progress. A second component was the management action team (MAT) consisting of two SCORE project members as well as surgeons, anesthesiologists, the OR nurse manager, OR nursing coordinator, central sterile supply staff, Continuous Quality Improvement staff and OR nursing staff (Scheriff et al., 2008).

Initial results of the SCORE project and MATs showed significant improvement in on-time starts (Scheriff et al., 2008). On-time starts within 15 minutes of the scheduled case improved to 90% in the first four months of the program. These results were largely attributed to a decrease in surgeon tardiness, which improved by bringing patients to the preoperative holding area in a timely matter. Room turnover also improved with a decrease of 47 minutes to 36.4 minutes over a two year period. The authors note that they were able to sustain this TOT for several months and are on their way to reaching their goal of 35 minutes or less.

1.3.3 Rapid Cycle Change Approach: A For-Profit Hospital

A publication in the Healthcare Financial Management Association (HFMA) bulletin recommends a rapid cycle change approach for improving OR efficiency (Philander & Kupietzky, 2011). By implementing a rapid cycle change, hospitals can see the results of an OR efficiency program in 12 to 18 weeks. This approach requires a dedicated team to achieve such a bold goal, where the time invested to implement is minimal and the outcomes reach maximal and sustainable results.

The authors describe a case in which a 479-bed for-profit hospital's OR had poor efficiency measures and sought to find the root cause of the problem to initiate change (Philander & Kupietzky, 2011). In conjunction with external support, perhaps in the form of a consultant, the OR team performed the rapid-cycle approach for over 8 weeks to redesign their operational processes. Through use of process flow charts, data transparency and workshops for OR team members, the hospital was able to show significant signs of improvement. After an 8-week time period, they were able to reduce FCS delays from 23 to 9 minutes and increase OR utilization by 33%. In terms of financial benefits, this hospital achieved $800,000 in cost savings as well as $550,000 in annualized new revenue.

Three stages were used in this rapid cycle approach: assessment, redesign and implementation (Philander & Kupietzky, 2011). In the assessment phase, an OR task force was developed, which encompassed team members across all OR disciplines including nurses, physicians and management staff with OR experience. The task force then had the responsibility to meet with physician partners, senior leadership and OR staff members to assess why and where change is needed, how staff will provide support to the changes, if rewards will be implemented and how the hospital's mission ties to the change. The redesign phase consisted of the task force taking the largest areas with an identified need for improvement and redesigning the processes. This phase incorporated many lean six sigma tools such as flow charts, eliminating bottlenecks and use of detailed plans for short- and long-term goals. Lastly, the implementation phase involved the task force extensively training the OR staff on the new processes. This phase is the most critical as it is able to measure the goals and results. In order to continually monitor the changes and progress, dashboards were created to visualize the targets.

For sustained OR efficiency, the authors recommend the creation of an OR committee to oversee the processes and analyze the dashboards on a regular basis (Philander & Kupietzky, 2011). Essentially, this committee would become the champions for OR efficiency amongst staff and senior leadership. A key take away from this case is that change can be implemented for a period of time anywhere; however, sustaining change in the long-term is the challenge ORs and hospitals will face. To ensure sustainability, it is imperative for the OR task force to engage the OR staff, utilize dashboards to monitor progress and make certain the staff understands that their work is vital to the hospital and patients in terms of safety and satisfaction.

1.3.4 Financial Incentive Program: University of Maryland School of Medicine

A unique approach was undertaken by the University of Maryland School of Medicine, where a financial incentive program (FIP) was established at their freestanding trauma hospital, R. Adams Cowley Shock Trauma Center (STC), to improve FCS and decrease TOT (Scalea et al., 2014). The OR committee at STC determined lack of teamwork and lack of incentive were

the main contributing factors to the inefficiencies in the OR. This lack of incentive propelled the OR committee to implement a point reward system for the surgical team.

Scalea et al. (2014) defined on-time first case starts (FCS) as a patient in the room within 6 minutes of the scheduled start time. Room TOT was defined as "wheels out" to "wheels in" and an arbitrary value of 60 minutes or less was chosen to begin with. The point system was structured such that each member of the surgical team earned one point when their team achieved an acceptable FCS and TOT. At the end of each month, points were totaled for each employee to determine financial bonuses. Additionally, surgical technicians and anesthesia technicians worked on a percentage system rather than a point system since they are involved in all ORs.

The FIP was implemented in February 2013, and results of this program were reported through December 2013 (Scalea et al., 2014). During this time period, FCS increased from 31% to 64% and TOT of 60 minutes or less increased in frequency from 24% to 52%. While there was a cost associated with implementing a FIP, the costs were minimal compared to the cost savings experienced by the hospital. Initially, the two month cost of the FIP was just under $8,500 in staff bonuses; however, during the same time period, the cost savings are estimated at $210,000 between the TOT decrease and FCS increase. The cost savings are significant compared to the monthly bonuses awarded to the OR team, yet the authors note there is difficulty in accurately estimating the savings, which they did based on the amount of time saved.

1.4 RECOMMENDATIONS FOR IMPROVEMENT

To optimize surgical services efficiency in the OR, several strategies that proved effective at other organizations may be applied to the hospital identified in this case. Thus far, the OR-has implemented letters to surgeons outlining performance expectations to lay the ground work for increased efficiency. While this strategy undoubtedly creates a framework for physician buy-in, incorporating surgeon leaders in this discussion can enhance outcomes. Additionally, the new process created to prep pre-operative patients on the sixth floor continues

to receive push-back from surgeons. This push-back was so substantial that surgical services leadership insisted this practice be changed. These factors contribute to the lack of multidisciplinary teamwork and lack of vision to optimize surgical services efficiency.

To ensure efficiency initiatives are carried out effectively, it is recommended that hospital leadership creates an OR efficiency program with Management Action Teams (MATs), as noted previously was successful in other case studies. After assessing the pertinent issues and attitudes toward change, a MAT can be created for each OR efficiency metric, which is recommended to be FCS, TOT and possibly OR utilization. The MAT would consist of a surgeon, anesthesiologist, nurse, surgical tech, clerical staff member and a management or administrative lead. Particularly for TOT, the MAT should include a staff member from housekeeping services and a staff member from the Sterile Processing Department. Initially, these teams should meet weekly to progress quickly by incorporating the principles of rapid-cycle change.

At this hospital, the Department of Surgery holds a monthly meeting which includes the Chair of Surgery, surgeons, the OR director, OR clinician, ASU clinician and pertinent OR support staff. To continually monitor the OR efficiency improvements, the MATs should give an update or report to the Department of Surgery meeting to engage all key members of the surgical services staff. Though key OR metrics are currently reported at each Department of Surgery meeting, the implementation of MATs for improved efficiency will place more of a focus on the dashboards. In recent experiences, dashboards are often reported and discussed, but little emphasis is placed on improving efficiency metrics to be in line with the system and national benchmarks. By emphasizing the metric improvements as compared to other system hospitals, the surgical services staff may become more engaged with the process changes.

Lastly, to ensure efficiency improvements are sustained, a financial incentive program (FIP) should be considered. Although this strategy will likely receive pushback from executive administration due to the initial cost outlay, is recommended that this option at least be explored for feasibility. As noted in the case of R. Adams Cowley Shock Trauma Center at the University of Maryland Medical Center, the costs of providing financial bonuses to OR teams was outweighed by the cost savings experienced by the OR (Scalea et al., 2014). The hospital should perform a return-on-investment analysis to estimate the potential benefits of a FIP. It is also a potential option that this strategy be used as a last effort to motivate and engage staff. If staff

engagement is not sustained via an OR efficiency program, perhaps there would be more of an effort if financial incentives are involved.

1.5 CONCLUSION

As health reform is placing increased pressure on hospitals to contain costs and maximize their revenue earning ability, improvements in efficiency are vital to future success. This statement is particularly true in the case of the OR, the hospital's largest revenue producer as well as the largest source of costs to the hospital.

In this Pittsburgh-area hospital, strategies that have shown to be somewhat effective were implemented to improve efficiency metrics, specifically FCS and TOT. A exemplified through four previous case studies, the OR has the ability to continue to significantly improve FCS and TOT among other metrics by implementing an OR efficiency program with Management Action Teams (MATs) to champion the project. By improving FCS and TOT, OR utilization will subsequently improve due to the hours freed in the OR. Additionally, FCS and TOT metrics are the framework for an efficient OR, which is why these metrics should be of focus. Through continual monitoring of this project by the Department of Surgery and hospital leadership, surgical services optimization can be sustained.

While the goal of this case study is to recommend strategies to optimize OR efficiency metrics, perhaps the largest obstacle moving forward will be change management. Surgeons and OR support staff can see the significance in an OR efficiency program, yet sustaining engagement will be the key to significant improvements. As noted previously in effective case studies, many hospitals experienced staff engagement simply by involving all members in the process. For the hospital to make considerable impact on OR efficiency improvements, effective leadership will prove to be crucial. If the resistance to change can be overcome, the OR will continue to see improvements, which in turn will reduce costs and maximize the revenue generating opportunity.

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